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* Guatam, V and Halwai, H.K. (2017) Comparison of Clinical Efficacy of Four Dentifrices In the Management Of Dentinal Hypersensitivity. IJSR International Journal of Scientific Research.6(2),239-240.

Hussain, H., Jan, S. M., & Behal, R. (2019). Clinical comparison of 5% fluoro calcium phosphosilicate versus 5% calcium sodium phosphosilicate in the treatment of dentinalhypersensitivity. International Journal of Medical and Biomedical Studies, 3(5).

Patel, V. R., Shettar, L., & Thakur, S, Gillam D, Kamala D.M. (2019). A randomised clinical trial on the efficacy of 5% fluorocalcium phosphosilicate-containing novel bioactive glasstoothpaste. Journal of Oral Rehabilitation 10.1111/joor.12847.

Reddy, G V., Surakanti, J. R., Vemisetty, H., Doranala, S., Hanumanpally, J. R., & Malgikar,S. (2019). Comparative assessment of effectiveness of Biomin, NovaMin, herbal, and potassium nitrate desensitizing agents in the treatment of hypersensitive teeth: A clinical study. Journal of Dr. NTR University of Health Sciences, 8(1), 24.

** Pereira, R., Gillam, D. G., Shaikh, K., & Phad, S. (2018). Comparative Evaluation of Desensitizing Dentifrices containing BioMin™, Novamin® and Fluoride on Dentinal Tubule Occlusion before and after a Citric Acid Challenge–A scanning Electron Microscope in-vitro Study. J Odontol, 2(105), 2..

The Smile Revolution supports dental professionals around the world

An interview with Victoria Wilson, Dental Therapist. By Brendan Day, DTI

As a dental therapist and trained yoga teacher, Victoria Wilson certainly understands the holistic nature of oral health and overall well-being. In 2019, she launched the Smile Revolution podcast, where she has talked to a range of dental professionals about their career ups and downs. Wilson spoke to Dental Tribune International (DTI) about how Smile Revolution is fulfilling its mission of promoting oral health and how the podcast has been received so far.

Victoria, thank you for taking the time to talk to DTI. Could you tell our readers a little bit about how Smile Revolution came about?

Well, I first did a degree in oral health promotion, which led me to become very interested in the topic—so much so that it really leads my career now. I was then invited to attend a global conference on social responsibility for dental hygienists and DCPs (dental care professionals), which led to further training and exploring further opportunities to support overcoming the most prevalent preventable dental disease, dental caries.

I wanted to explore what we could be doing in the dental profession to overcome the inequalities that exist in this regard. While our clinical workload is limited to those whom we are able to access, there are other channels through which we can reach more people and have an impact on their oral health. With this in mind, I began to formulate an oral health promotional entity, which eventually became Smile Revolution.

What was it that prompted you to launch the Smile Revolution podcast?

One of my main goals with Smile Revolution is to support the profession of dentistry by sharing dental professionals' stories about what they've learned throughout their careers. By spreading these stories through the Smile Revolution podcast, others can listen from anywhere in the world and be inspired. For me, many people are inspirational, but it can sometimes be hard to gain that insight into them until you have a one-on-one conversation and are free to ask them questions you might normally be a bit reluctant about approaching.

The Smile Revolution podcast is essentially a passion project to support my dental colleagues around the world, to help them advance their thinking by listening to the journeys of others.

In your eyes, who is the target audience of the podcast?

I'd say that the target audience is DCPs, dental therapists and dental hygienists, as these are generally the greatest proportion of listeners. However, I do know that dental nurses and dental specialists also like to listen.

SMILE REVOLUTION

Have these conversations changed anything about how you approach dentistry or helped to guide your own career choices?
Oh, absolutely. In dentistry, you need to be constantly re-evaluating and reshaping your pathways based on what you've learned and opportunities that you may encounter, and so the podcast has definitely helped me to do this. I get a lot out of speaking to my guests and I know that others do too—I get messages from people telling me what they've gained from listening to it, and this means so much to me.

On that topic—what has the feedback been like for Smile Revolution?
Well, as dental professionals, we're generally quite open to learning online through webinars and other events, particularly during these COVID-19 times, but there wasn't anything out there that supported on-the-go learning in the way that the podcast does. It's something that you can engage with while commuting, for example, and other dental professionals really seem to appreciate how it can help them to recognise and overcome challenges that they're facing.

In dentistry, it can sometimes be very easy to get absorbed by a certain aspect of your work that you've been involved with for a long time, and you may feel stagnated and may find it challenging to find a solution to a certain problem; you may also be unaware of new pathways opening up for your career. I hope that the podcast continues to provide listeners with a new way of implementing tips and guidance into their everyday practice that can actively help them and their patients, as well as opportunities outside of clinical settings.

Have you found that the informal nature of the conversations on the podcast help it to resonate with listeners?
Yes, especially because all of the guests on the podcast are registered clinicians who are working with an evidence-based approach. The stories that they're providing are from real-life clinical situations and involve ways of working that have been adapted to fit the patient's needs, but the conversation itself is unplanned and informal—listeners can turn the podcast on and really relate to certain scenarios, whereas when you're listening to a presenter at a conference, it's obviously a bit more planned out and generally more formal.

Has the COVID-19 pandemic changed the way you approach oral health promotion through Smile Revolution?
I'm aware that there are so many online platforms at the moment, partially because of the pandemic, but what I focus on is talking to and delving into my guests' stories and learning about what they have overcome. So while Smile Revolution's content is always changing along with the ways we reach our audience, COVID-19 hasn't really changed the overall mission of the podcast.

It's been a very uncertain time for clinicians across the globe that has caused a lot of anxiety, and as a result, something additional that I'm offering through Smile Revolution is online yoga classes. I'm a registered yoga teacher, and one element of Smile Revolution's mission is to support the dental profession, which includes helping their overall well-being. Around 70 per cent of the dental workforce has experienced musculoskeletal issues, and the profession can have a profound impact on not just our bodies but our minds as well, so doing something like yoga can help greatly in this respect.

Lastly, I am just about to launch a course on how to start an oral health promotional business. I wish to share with the dental profession all I have learnt in the process of establishing Smile Revolution and now share this with colleagues to enable them to create their own sustainable oral health promotional projects and businesses so that we collectively as a dental profession continue to elevate our reach to serve overcoming the most prevalent preventable disease globally, dental caries.

BioMin F in Smile Revolution podcast

Victoria Wilson, UK

I recently recorded a podcast with Prof. Robert Hill and Richard Whatley (CEO at BioMin Technologies Ltd) on BioMin F toothpaste—an in-depth conversation on a very interesting toothpaste. During the preparation for this recording and after it, I developed an interest in the area as my understanding evolved. In this article, I wish to share my insight into some other considerations I have become aware of that we could include in building our understanding around toothpastes in general.

Over the past years, I have not really been drawn to analysing toothpastes to the extent that I have with BioMin F until the Oral Health Conference and Exhibition in Cardiff in the UK last year, when I came to learn about BioMin F, which made me want to explore toothpastes further.

As dental care professionals (DCPs), I and my peers have a duty to recommend toothpastes to our patients in alignment with supporting evidence. I would generally assess the patient's overall needs, such as does he or she experience sensitivity, what is the trigger, are there any other relevant clinical conditions that I may need to take into consideration? On enquiring about what toothpaste he or she is currently using and identifying that the sensitivity is due to dentine exposure, I would follow on by checking whether his or her existing toothpaste aligns with his or her clinical needs and has supporting evidence, aligning with the recommendations outlined in *Delivering Better Oral Health: An Evidence-Based Toolkit for Prevention.*[1] I would then share any information regarding any other options he or she could benefit from, for consideration in order to make an informed decision for change if required.

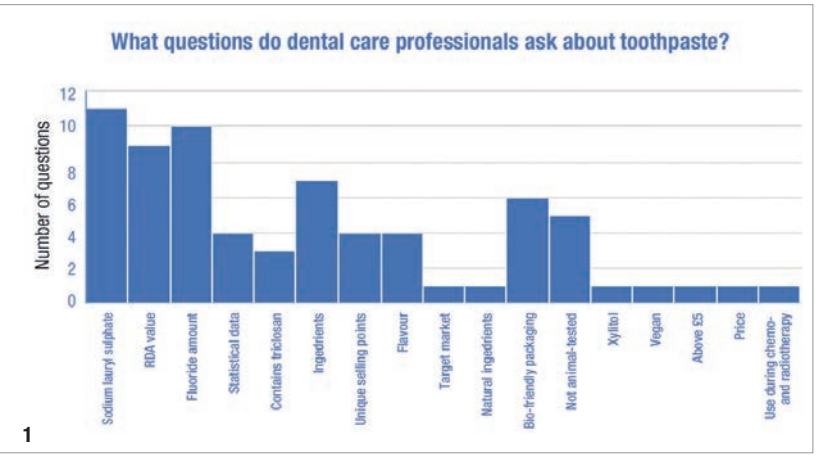

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Fig. 1: Responses of 23 dental hygienists and dental therapists on features of dental toothpaste. RDA = relative dentine abrasion.

After running through my own personal assessment process of the questions I have surrounding toothpastes, I decided to reach out to a wider audience through social media, to understand what dental hygienists and dental therapists currently wish to know about a toothpaste to help build their understanding. I proceeded to pose a question on a social media platform for dental hygienists and dental therapists to gain a broader insight into what typical things we as DCPs look for in a toothpaste: "There is a new toothpaste on the market that is not specifically focused on treating anything in particular. What questions would you ask about the toothpaste?"

Figure 1 shows the responses of 23 dental hygienists and dental therapists obtained through the post on social media. Although this is a small group of respondents, these findings were interesting to understand what we as DCPs currently consider when we build our understanding of a toothpaste. The DCPs' priority questions are as follows:

- Does the toothpaste contain sodium lauryl sulphate (SLS)?
- What is the toothpaste's relative dentine abrasion (RDA) value?
- What amount of fluoride does the toothpaste contain?

Why are we focused on SLS?

SLS and fluoride were certainly top of my list owing to the consensus that toothpaste containing SLS could contribute to aphthous ulcers. Yet, what is the evidence on SLS-containing toothpaste causing aphthous ulcers? According to a systematic review published in 2019, future well-designed trials are still required to strengthen the current body of evidence regarding recurrent aphthous stomatitis (RAS) and current evidence merely suggests that patients with RAS may benefit from using an SLS-free toothpaste.[2] It appears that there is currently insufficient evidence on the use of SLS toothpaste as a causative factor of RAS. Could this finding alter our thinking process in prioritising the need to know whether a toothpaste is SLS-free or not? If a patient shows signs of RAS, it would appear that we do not need to be recommending against the use of an SLS-free toothpaste linked to RAS. Even if a patient was to show signs of RAS, you could suggest stopping the SLS toothpaste for time, to monitor whether there is any change in the appearance of RAS, yet it may be questionable from the evidence to state that SLS is a causative factor.

Toothpaste consideration pathway

Questions	What is the evidence?	What other questions could we be asking and why?
What is the fluoride content?	There is sufficient evidence to support the inclusion of fluoride in toothpaste.[2]	How long does the fluoride remain in the mouth? What is the source of the fluoride (e.g. soluble fluoride molecule or a fluoride-containing bioactive glass)? Is the fluoride delivery through a soluble fluoride molecule such as sodium fluoride, sodium monofluorophosphate? If so, then 1,450 ppm is recommended, based on the evidence of soluble fluoride, since it dissipates away in 90 minutes.
Is the toothpaste SLS-free?*	There is currently insufficient evidence on the use of SLS-containing toothpaste as a causative factor of RAS‡.[1]	What is the current evidence supporting this? If the toothpaste is SLS-free, what surfactant has been used?
What is the toothpaste's RDA† value?	An RDA value of 250 or less is recommended.	What are the other factors contributing to tooth wear that could be controlled?
Does the fluoride remain in the mouth for longer than 90 minutes?	In the past, fluoride ions have been known to dissipate within 90 minutes.	How long does the fluoride remain in the mouth, and through what mechanism is this achieved?
What is the clinical glass particle size?	The particle size appears optimal for deposition within the dentinal tubules and reduction of abrasiveness.	How does the glass particle size differ from that of other fluoride-containing toothpastes?
How effective is the tooth paste at treating sensitivity?	There is clinical evidence supporting the impact on sensitivity over a 4-week period.	For how long does the desensitisation last?
What effect does the toothpaste have on the pH?	The lower the pH, the faster the fluoride, calcium and potassium ions are released.	How does the toothpaste raise the pH?
Is the patient possibly susceptible to fluorosis?		If there is a lower fluoride concentration too, this would reduce the risk of fluorosis.
Does the toothpaste have a strong flavour?		It is preferable that the patient does not rinse, so whether the toothpaste is strong or mild in flavour could be a consideration.

Table 1. * SLS = sodium lauryl sulphate. † RDA = relative dentine abrasion. ‡ RAS = recurrent aphthous stomatitis.

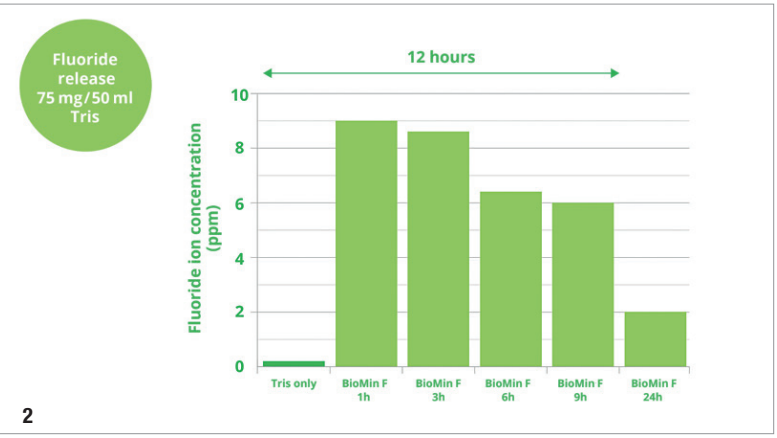
Essentially SLS is a surfactant, which helps with the foaming and texture of the toothpaste. Surfactants are essential elements of toothpastes. A toothpaste being SLS-free does not necessarily mean that it is surfactant-free. It is the surfactants by nature that are slightly aggressive to soft tissue; swapping from an SLS-containing toothpaste to one containing an alternative surfactant does not necessarily overcome the RAS issue. Some surfactants are even more aggressive than SLS.

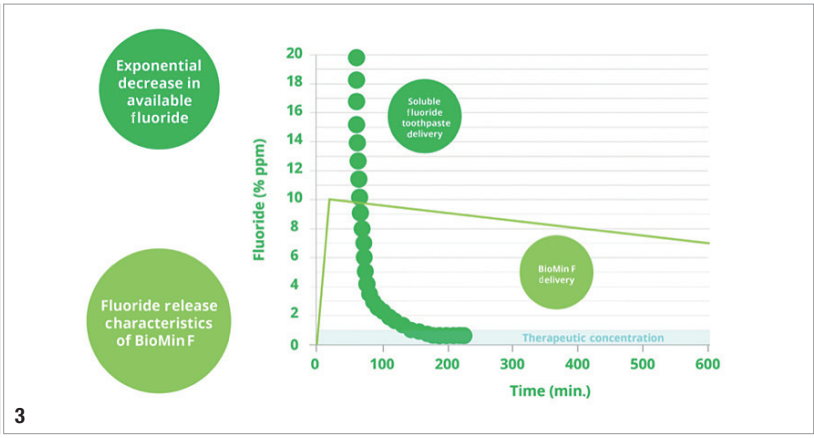
What is the evidence on fluoride?

There is sufficient evidence that supports the inclusion of fluoride in toothpaste. Relatively high-quality trials provide clear evidence that fluoride toothpastes are efficacious in preventing dental caries.[3] An increased amount of fluoride in a toothpaste decreases the risk of caries, and in following *Delivering Better Oral Health*, which is evidence-based, we focus on the recommended amounts of 1,350 to 1,500 ppm fluoride.[1]

According to Prof. J.M. ten Cate, the world-renowned caries expert, "For treatments to be effective over periods longer than the brushing and the following salivary clearance, fluoride needs to be deposited and slowly released."[4] Research has shown that the quantity of fluoride is not the complete answer.

Considering Prof. Hill's statements in the Smile Revolution podcast recording and what Prof. ten Cate has said, should we be questioning further the length of time the fluoride remains in the mouth, as well as the amount of fluoride and the mechanism by which the fluoride is made available in the mouth? For years, we have recommended a fluoride mouthwash in support of fluoride availability; however, if it is now possible for the fluoride





Figs. 2 & 3: BioMin F is a toothpaste containing glass materials that are able to dissolve slowly in saliva within 12 hours.

to be released slowly over a period through a toothpaste, this could be optimal.

There is not enough fluoride in BioMin F, according to *Delivering Better Oral Health*. However according to Prof. Hill in the recent podcast recording, the toolkit was written prior to the release of BioMin F, so this could be a reason that the recommended fluoride content for children above seven, young adults and adults did not take into account the lower fluoride content of BioMin F. We will explore this further in the section on mechanism of bonding. The Oral Health Foundation however has accredited BioMin F as an approved oral healthcare product. The Oral Health Foundation evaluates consumer oral healthcare products to ensure that the claims made by manufacturers are clinically proven and not exaggerated.

RDA value

It is important to consider that tooth wear is multifactorial. The abrasiveness of the toothpaste will play a limited role in the overall process of tooth wear. From various articles, it would be fair to say that all toothpastes that have an RDA value of below 250 are considered safe to use. An RDA value of 250 or less produces little wear on dentine and virtually no wear on enamel for the long term if used with a correct brushing technique.[7]

Now that we have looked at the evidence supporting the most popular questions, I will look into our current understanding on the amount of fluoride in toothpastes in a bit more depth. Generally our questions are based on our knowledge; the greater our knowledge on a topic, the more questions we have in seeking to understand something further. Through recording the podcast with Prof. Hill and Mr Whatley, I learnt so much about BioMin F that my curiosity evolved around the additional benefits toothpaste could have in light of ongoing ingredient developments.

Through understanding the mechanism of BioMin F, I realised that this toothpaste could essentially become a significant contributing factor in the reduction of dental caries

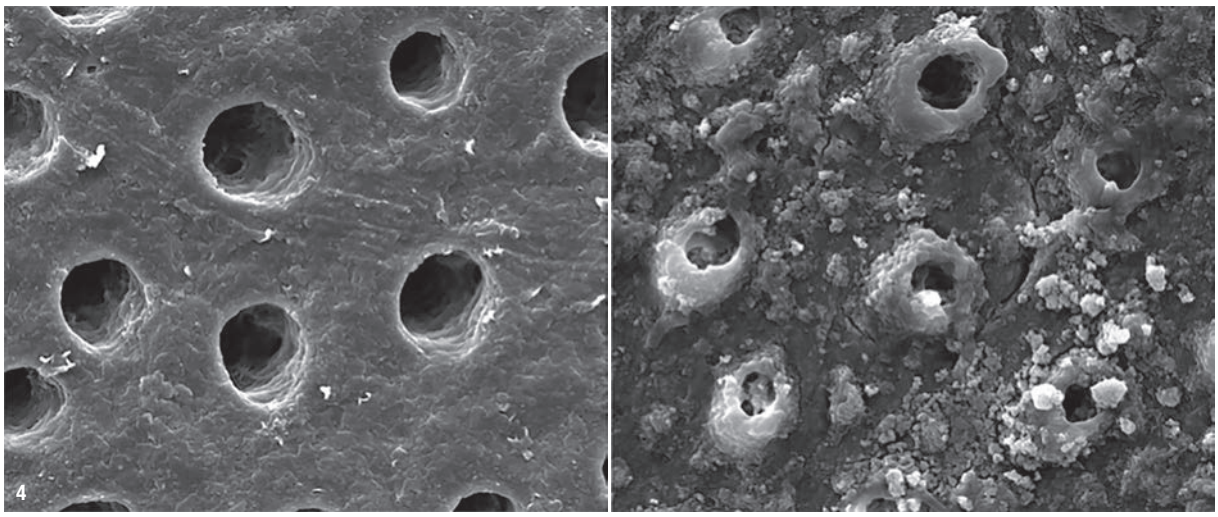
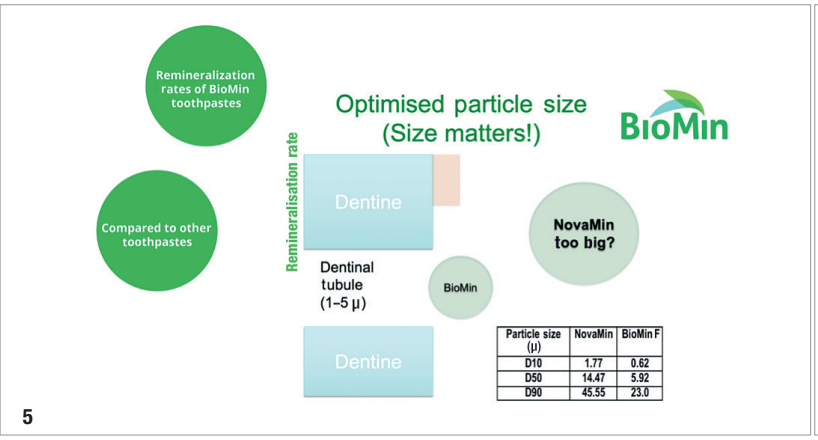


Fig. 4: The mechanism of bonding of the glass particles to the tooth surface.



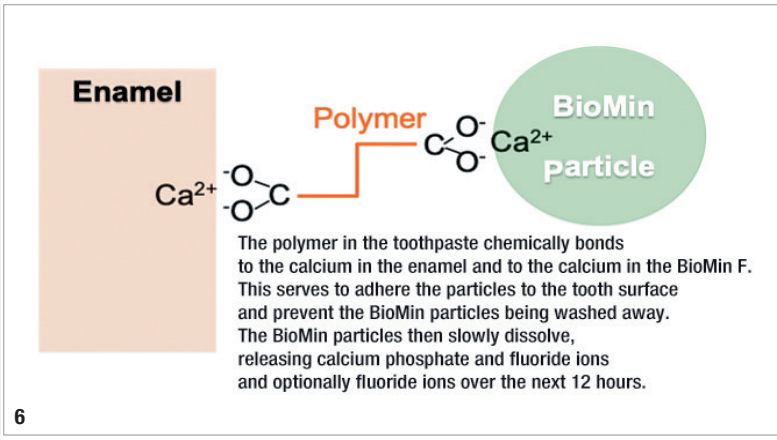


Fig. 5: The dentinal tubules before and after brushing with BioMin F. **Fig. 6:** How BioMin F works.

if used and recommended correctly. I have developed a pathway of questions that DCPs could utilise in evaluating toothpastes as part of future toothpaste analysis that have been inspired from the current questions and BioMin F (Table 1).

So what is different about BioMin F?

BioMin F is a toothpaste containing glass materials that are able to dissolve slowly in saliva within 12 hours (Figs. 2 & 3) and adhere to dental tissue. This is a particularly interesting, unique fact about BioMin F that aligns with what Prof. ten Cate has stated regarding the need for fluoride to be deposited and released slowly. There is only 600 ppm fluoride in BioMin F, the optimal amount of fluoride to exert a beneficial effect. Unlike other toothpastes, this is a favourable characteristic of BioMin F, especially for patients concerned about fluorosis.

Although glass particles have been introduced into toothpaste previously, such as with NovaMin, which contains calcium and phosphate. The fluoride was not integrated into the glass particles. The concentration of phosphate in the glass particles of BioMin F toothpaste is much higher, accelerating apatite formation. As the glass particles dissolve, the ions are released, precipitating fluorapatite.

In a comparative clinical study of 160 patients, the BioMin F group showed significantly better results compared with NovaMin, herbal and potassium nitrate toothpastes in the treatment of dentine hypersensitivity symptoms.[5] Some clinicians have been reporting up to 90 per cent relief from hypersensitivity. This is likely to be due to the size of the bioactive glass materials outlined in Figure 4. BioMin F has been developed to help reduce tooth sensitivity, and the size of the glass particle helps replace lost mineral from tooth surfaces to protect against acid erosion, as evident in the clinical trial. It is the particle size of the glass that helps reduce sensitivity through occluding the dentinal tubules as shown in Figure 5. The mechanism of bonding is perfectly shown in this image; it is important to remember that the glass particles adhere to tooth surfaces for up to 12 hours.

As with any toothpaste, there are external variables that could limit the toothpaste's effectiveness however if the toothpaste is used twice a day and the patient does not rinse or eat directly thereafter then the toothpaste will be more effective. As Mr Whatley discusses in the podcast recording, it is also advisable for the patient to swirl the toothpaste around with his or her tongue to help distribute the toothpaste around the mouth.

How does the toothpaste react in a low-pH environment?

Bioactive glasses dissolve faster under acidic conditions than under neutral or basic conditions, quickly raising the pH and releasing calcium phosphate and fluoride ions; this is significant for caries-prone patients and patients who have a diet high in sugar. The fluorapatite dissolves at a pH value of just less than that of hydroxyapatite at 1.5 pH.

Editorial note: A list of references is available from the publisher. To listen to the full podcast recording, subscribe to the Smile Revolution podcast (www.smile-revolution.net). Available on Stitcher, Spotify, TuneIn, Acast and Pocket Casts.

about

Victoria Wilson holds a BSc and a Diploma in Dental Therapy and Diploma in Dental Hygiene awarded by the Royal College of Surgeons of England in the UK. She has over ten years of experience as a dental and hygiene therapist, beginning in the NHS and private sector in the UK and progressing to the private sector in the UAE. Wilson is passionate about her work and fully committed to oral health promotion around the world. In 2019, she launched the Smile Revolution podcast. She can be reached at info@smile-revolution.net.